WHAT IS CLAIMED IS:

1. An electrical power generating system, comprising:

a vibrating assembly which displaces in response to fluid flow across the vibrating assembly; and

a generator which generates electrical power in response to displacement of the vibrating assembly,

wherein the vibrating assembly includes a lift reversal device which produces alternating lift coefficients in the vibrating assembly in response to the fluid flow across the vibrating assembly.

2. The system according to claim 1, wherein the vibrating assembly vibrates in response to the alternating lift coefficients in the vibrating assembly.

3. The system according to claim 1, wherein the lift reversal device is generally rectangular prism-shaped.

4. The system according to claim 1, wherein the vibrating assembly further includes an elastic support for the lift reversal device, the elastic support biasing the lift reversal device toward a neutral position against lift forces produced by the fluid flow.

5. The system according to claim 1, wherein the generator includes an electromagnetically active material, and wherein strain is produced in the material in response to displacement of the vibrating assembly.

6. The system according to claim 1, wherein the generator includes a magnet and coil, and wherein relative displacement between the magnet and coil produces electricity in the coil in response to displacement of the vibrating assembly.

7. The system according to claim 6, wherein a magnetic field produces electricity in the coil in response to strain being produced in an electromagnetically active material of the generator.

8. The system according to claim 6, wherein the generator further includes at least two of the magnets, and wherein a ferromagnetic spacer positioned between the magnets concentrates magnetic fields produced by the magnets.

9. The system according to claim 6, wherein displacement of the vibrating assembly in response to the fluid flow is initiated by applying an electric potential to the coil.

10. The system according to claim 6, wherein a passage extends between opposite ends of the coil, and wherein the passage is in fluid communication with the fluid flowing across the vibrating assembly at each opposite end of the coil.

11. The system according to claim 1, wherein the generator includes a magnet which is displaced relative to a ferromagnetic core, thereby producing electricity in a coil in response to displacement of the vibrating assembly.

12. The system according to claim 1, wherein the generator includes a housing which is displaced in response to displacement of the vibrating assembly, wherein the housing contains a magnet and a coil, and wherein relative displacement between the magnet and coil produces electricity in the coil in response to displacement of the housing.

13. The system according to claim 1, wherein the generator includes first and second magnets, and a coil, wherein relative displacement between the first magnet and the coil is produced in response to displacement of the vibrating assembly, and wherein magnetic fields produced by the first and second magnets bias against relative displacement between the first and second magnets.

14. The system according to claim 1, wherein the generator includes a magnet and coil, and wherein relative rotation between the magnet and coil is produced in response to displacement of the vibrating assembly.

15. The system according to claim 1, wherein the vibrating assembly displaces in response to fluid flow in a wellbore of a subterranean well.

16. An electrical power generating system, comprising:

a vibrating assembly which displaces in response to fluid flow across the vibrating assembly; and

a generator which generates electrical power in response to displacement of the vibrating assembly,

wherein displacement of the vibrating assembly is transmitted to the generator across a membrane isolating at least a portion of the generator from the fluid flow.

17. The system according to claim 16, wherein the membrane includes a relatively rigid portion and a relatively flexible portion.

18. The system according to claim 16, wherein the vibrating assembly displacement is rotational in response to the fluid flow.

19. The system according to claim 18, wherein the rotational displacement of the vibrating assembly produces axial displacement in the generator portion.

20. The system according to claim 16, wherein the generator portion includes an electromagnetically active material, and wherein strain is produced in the material in response to displacement of the vibrating assembly.

21. The system according to claim 16, wherein the generator includes a magnet and coil, and wherein relative displacement between the magnet and coil produces electricity in the coil in response to displacement of the vibrating assembly.

22. The system according to claim 21, wherein a magnetic field produces electricity in the coil in response to strain being produced in an electromagnetically active material.

23. The system according to claim 21, wherein the generator further includes at least two of the magnets, and wherein a ferromagnetic spacer positioned between the magnets concentrates magnetic fields produced by the magnets.

24. The system according to claim 21, wherein displacement of the vibrating assembly in response to the fluid flow is initiated by applying an electric potential to the coil.

25. The system according to claim 21, wherein a passage extends between opposite ends of the coil, and wherein the passage is in fluid

communication with the fluid flowing across the vibrating assembly at each opposite end of the coil.

26. The system according to claim 16, wherein the generator includes a magnet which is displaced relative to a ferromagnetic core, thereby producing electricity in a coil in response to displacement of the vibrating assembly.

27. The system according to claim 16, wherein the generator includes a housing which is displaced in response to displacement of the vibrating assembly, wherein the housing contains a magnet and a coil, and wherein relative displacement between the magnet and coil produces electricity in the coil in response to displacement of the housing.

28. The system according to claim 16, wherein the generator includes first and second magnets, and a coil, wherein relative displacement between the first magnet and the coil is produced in response to displacement of the vibrating assembly, and wherein magnetic fields produced by the first and second magnets bias against relative displacement between the first and second magnets.

29. The system according to claim 16, wherein the generator includes a magnet and coil, and wherein relative rotation between the magnet and coil is produced in response to displacement of the vibrating assembly.

30. The system according to claim 16, wherein the vibrating assembly includes a lift reversal device which produces alternating lift coefficients in the vibrating assembly in response to the fluid flow across the vibrating assembly.

31. The system according to claim 16, wherein the vibrating assembly displaces in response to fluid flow in a wellbore of a subterranean well.

32. An electrical power generating system, comprising:

a vibrating assembly which displaces in response to fluid flow across the vibrating assembly; and

a generator which generates electrical power in response to displacement of the vibrating assembly,

wherein the generator includes a magnet and coil, and wherein relative rotation between the magnet and coil is produced in response to displacement of the vibrating assembly.

33. The system according to claim 32, wherein the magnet and coil are contained within a housing.

34. The system according to claim 33, wherein the housing isolates the magnet and coil from the fluid flow.

35. The system according to claim 33, wherein the housing is positioned at a center of rotation of the vibrating assembly.

36. The system according to claim 32, wherein the vibrating assembly displaces in response to fluid flow in a wellbore of a subterranean well.

37. An electrical power generating system, comprising:

a vibrating assembly which displaces in response to fluid flow across the vibrating assembly; and

a generator which generates electrical power in response to displacement of the vibrating assembly,

wherein the generator includes first and second magnets, and a coil, wherein relative displacement between the first magnet and the coil is produced in response to displacement of the vibrating assembly, and wherein magnetic fields produced by the first and second magnets bias against relative displacement between the first and second magnets.

38. The system according to claim 37, wherein the first magnet and the coil are contained within a housing.

39. The system according to claim 38, wherein the housing isolates the first magnet and coil from the fluid flow.

40. The system according to claim 38, wherein the housing remains substantially rigidly mounted while the second magnet displaces in response to displacement of the vibrating assembly.

41. The system according to claim 37, wherein the vibrating assembly displaces in response to fluid flow in a wellbore of a subterranean well.

42. An electrical power generating system, comprising:

a vibrating assembly which displaces in response to fluid flow across the vibrating assembly; and

a generator which generates electrical power in response to displacement of the vibrating assembly,

wherein the generator includes a housing which is displaced in response to displacement of the vibrating assembly, wherein the housing contains a first magnet and a coil, and wherein relative displacement between the first magnet and coil produces electricity in the coil in response to displacement of the housing.

43. The system according to claim 42, wherein the first magnet is supported relative to the coil by at least one biasing device.

44. The system according to claim 43, wherein the biasing device includes a spring.

45. The system according to claim 43, wherein the biasing device includes an elastomeric member.

46. The system according to claim 43, wherein the biasing device includes a compressed fluid.

47. The system according to claim 43, wherein the biasing device includes at least one second magnet.

48. The system according to claim 47, wherein at least one pole of the second magnet repels at least one pole of the first magnet.

49. The system according to claim 42, wherein displacement of the vibrating assembly in response to the fluid flow is initiated by applying an electric potential to the coil.

50. The system according to claim 49, wherein the application of an electric potential to the coil displaces the vibrating assembly relative to the fluid flow.

51. The system according to claim 49, wherein the application of an electric potential to the coil produces strain in an elastic support which supports the vibrating assembly.

52. The system according to claim 42, wherein the vibrating assembly displaces in response to fluid flow in a wellbore of a subterranean well.

53. An electrical power generating system, comprising:

a vibrating assembly which displaces in response to fluid flow across the vibrating assembly; and

a generator which generates electrical power in response to displacement of the vibrating assembly,

wherein the generator includes a magnet which is displaced relative to a ferromagnetic core, thereby producing electricity in a coil in response to displacement of the vibrating assembly.

54. The system according to claim 53, wherein the magnet is aligned with a longitudinal axis of the vibrating assembly.

55. The system according to claim 53, wherein the ferromagnetic core is aligned with a longitudinal axis of the vibrating assembly.

56. The system according to claim 53, wherein the coil is aligned with a longitudinal axis of the vibrating assembly.

57. The system according to claim 53, wherein the coil and ferromagnetic core remain substantially rigidly mounted while the magnet is displaced in response to displacement of the vibrating assembly.

58. The system according to claim 53, wherein the generator further includes multiple magnets which are displaced relative to respective multiple ferromagnetic cores, thereby producing electricity in respective multiple coils in response to displacement of the vibrating assembly.

59. The system according to claim 53, wherein the vibrating assembly displaces in response to fluid flow in a wellbore of a subterranean well.

60. An electrical power generating system, comprising:

a vibrating assembly which displaces in response to fluid flow across the vibrating assembly; and

a generator which generates electrical power in response to displacement of the vibrating assembly,

wherein the generator includes a magnet and coil, wherein relative displacement between the magnet and coil produces electricity in the coil in response to displacement of the vibrating assembly, wherein a passage extends between opposite ends of the coil, and wherein the passage is in fluid communication with the fluid flowing across the vibrating assembly at each opposite end of the coil.

61. The system according to claim 60, wherein the magnet is aligned with a longitudinal axis of the vibrating assembly.

62. The system according to claim 60, wherein the coil is aligned with a longitudinal axis of the vibrating assembly.

63. The system according to claim 60, wherein the coil remains substantially rigidly mounted while the magnet is displaced in response to displacement of the vibrating assembly.

64. The system according to claim 60, wherein the vibrating assembly displaces in response to fluid flow in a wellbore of a subterranean well.

65. An electrical power generating system, comprising:

a vibrating assembly which displaces in response to fluid flow across the vibrating assembly; and

a generator which generates electrical power in response to displacement of the vibrating assembly,

wherein the generator includes a magnet and coil, wherein relative displacement between the magnet and coil produces electricity in the coil in response to displacement of the vibrating assembly, and wherein displacement of the vibrating assembly in response to the fluid flow is initiated by applying an electric potential to the coil.

66. The system according to claim 65, wherein the application of the electric potential to the coil displaces the vibrating assembly relative to the fluid flow.

67. The system according to claim 65, wherein the application of the electric potential to the coil produces strain in an elastic support which supports the vibrating assembly.

68. The system according to claim 65, wherein the vibrating assembly displaces in response to fluid flow in a wellbore of a subterranean well.

69. An electrical power generating system, comprising:

a vibrating assembly which displaces in response to fluid flow across the vibrating assembly; and

a generator which generates electrical power in response to displacement of the vibrating assembly,

wherein the generator includes an electromagnetically active material, strain being produced in the electromagnetically active material in response to displacement of the vibrating assembly.

70. The system according to claim 69, wherein electricity is produced in a coil of the generator in response to strain being produced in the electromagnetically active material.

71. The system according to claim 69, wherein the electromagnetically active material is a magnetostrictive material.

72. The system according to claim 69, wherein the electromagnetically active material is a piezoelectric material.

73. The system according to claim 69, wherein the electromagnetically active material is an electrostrictive material.

74. The system according to claim 69, wherein the generator further includes a magnet and coil, and wherein relative displacement between the magnet and coil produces electricity in the coil in response to displacement of the vibrating assembly.

75. The system according to claim 74, wherein a magnetic field produces electricity in the coil in response to strain being produced in the electromagnetically active material.

76. The system according to claim 74, wherein the generator further includes at least two of the magnets, and wherein a ferromagnetic spacer positioned between the magnets concentrates magnetic fields produced by the magnets.

77. The system according to claim 74, wherein displacement of the vibrating assembly in response to the fluid flow is initiated by applying an electric potential to the coil.

78. The system according to claim 74, wherein a passage extends between opposite ends of the coil, and wherein the passage is in fluid communication with the fluid flowing across the vibrating assembly at each opposite end of the coil.

79. The system according to claim 69, wherein the generator includes a magnet which is displaced relative to a ferromagnetic core, thereby producing electricity in a coil in response to displacement of the vibrating assembly.

80. The system according to claim 69, wherein the generator includes a housing which is displaced in response to displacement of the vibrating assembly, wherein the housing contains a magnet and a coil, and wherein relative displacement between the magnet and coil produces electricity in the coil in response to displacement of the housing.

81. The system according to claim 69, wherein the generator includes first and second magnets, and a coil, wherein relative displacement between the first magnet and the coil is produced in response to displacement of the vibrating assembly, and wherein magnetic fields produced by the first and second magnets bias against relative displacement between the first and second magnets.

82. The system according to claim 69, wherein the generator includes a magnet and coil, and wherein relative rotation between the magnet and coil is produced in response to displacement of the vibrating assembly.

83. The system according to claim 69, wherein the vibrating assembly includes a lift reversal device which produces alternating lift coefficients in the vibrating assembly in response to the fluid flow across the vibrating assembly.

84. The system according to claim 69, wherein the vibrating assembly displacement is transmitted to the electromagnetically active material across a membrane isolating the material from the fluid flow.

85. The system according to claim 69, wherein displacement of the vibrating assembly in response to the fluid flow is initiated by applying an electric potential to the electromagnetically active material.

86. The system according to claim 69, wherein displacement of the vibrating assembly in response to the fluid flow is initiated by applying a magnetic field to the electromagnetically active material.

87. The system according to claim 69, wherein displacement of the vibrating assembly in response to the fluid flow is initiated by producing strain in the electromagnetically active material.

88. The system according to claim 69, wherein the vibrating assembly displaces in response to fluid flow in a wellbore of a subterranean well.

89. An electrical power generating system, comprising:

a beam which displaces in response to fluid flow across the beam, thereby producing a region of relatively reduced strain energy in the beam and a region of relatively increased strain energy in the beam; and

an electromagnetically active material attached to the beam, the electromagnetically active material having relatively reduced volume in the region of relatively reduced strain energy in the beam, and the electromagnetically active material having relatively increased volume in the region of relatively increased strain energy in the beam.

90. The system according to claim 89, wherein the electromagnetically active material is attached in multiple layers to the beam, the relatively reduced volume of electromagnetically active material having fewer of the layers than the relatively increased volume of electromagnetically active material.

91. The system according to claim 89, wherein the electromagnetically active material is attached in multiple layers to the beam, and wherein a number of the layers on the beam increases in a direction from the from the region of relatively reduced strain energy in the beam to the region of relatively increased strain energy in the beam.

92. The system according to claim 89, wherein a thickness of the electromagnetically active material increases in a direction from the relatively reduced volume of electromagnetically active material to the relatively increased volume of electromagnetically active material.

93. The system according to claim 89, wherein a thickness of the electromagnetically active material increases in a direction from the region of relatively reduced strain energy in the beam to the region of relatively increased strain energy in the beam.

94. The system according to claim 89, wherein the region of relatively increased strain energy in the beam is positioned closer to a rigidly mounted end of the beam than to a free end of the beam.

95. The system according to claim 89, wherein the region of relatively reduced strain energy in the beam is positioned closer to a free end of the beam than to a rigidly mounted end of the beam.

96. The system according to claim 89, wherein a thickness of the beam increases in a direction from a free end of the beam to a rigidly mounted end of the beam.

97. The system according to claim 89, wherein a thickness of the beam increases in a direction from the region of relatively reduced strain energy to the region of relatively increased strain energy.

98. The system according to claim 89, wherein a vortex shedding device is attached to the beam, the vortex shedding device shedding vortices in response to the fluid flow.

99. The system according to claim 98, wherein the vortex shedding device sheds the vortices at a frequency substantially equal to a resonant frequency of the beam.

100. The system according to claim 89, wherein the beam displaces in response to fluid flow in a wellbore of a subterranean well.

101. An electrical power generating system, comprising:

a beam which displaces in response to fluid flow across the beam, the beam having a thickness which increases along a length of the beam; and

an electromagnetically active material attached to the beam, so that displacement of the beam produces electricity in response to strain in the electromagnetically active material.

102. The system according to claim 101, wherein the thickness of the beam increases in a direction from a free end of the beam to a rigidly mounted end of the beam.

103. The system according to claim 101, wherein a vortex shedding device is attached to the beam, the vortex shedding device shedding vortices in response to the fluid flow.

104. The system according to claim 103, wherein the vortex shedding device sheds the vortices at a frequency substantially equal to a resonant frequency of the beam.

105. The system according to claim 101, wherein the beam displaces in response to fluid flow in a wellbore of a subterranean well.

106. The system according to claim 101, wherein displacement of the beam produces a region of relatively reduced strain energy in the beam and a region of relatively increased strain energy in the beam.

107. The system according to claim 106, wherein a thickness of the beam increases in a direction from the region of relatively reduced strain energy to the region of relatively increased strain energy.

108. The system according to claim 106, wherein the electromagnetically active material is attached in multiple layers to the beam, and wherein a number of the layers on the beam increases in a direction from the from the region of relatively reduced strain energy in the beam to the region of relatively increased strain energy in the beam.

109. The system according to claim 106, wherein a thickness of the electromagnetically active material increases in a direction from the region of relatively reduced strain energy in the beam to the region of relatively increased strain energy in the beam.

110. The system according to claim 106, wherein the region of relatively increased strain energy in the beam is positioned closer to a rigidly mounted end of the beam than to a free end of the beam.

111. The system according to claim 106, wherein the region of relatively reduced strain energy in the beam is positioned closer to a free end of the beam than to a rigidly mounted end of the beam.

112. The system according to claim 106, wherein the electromagnetically active material has a relatively reduced volume in the region of relatively reduced strain energy in the beam, and the electromagnetically active material has a relatively increased volume in the region of relatively increased strain energy in the beam.

113. The system according to claim 112, wherein the electromagnetically active material is attached in multiple layers to the beam, the relatively reduced volume of electromagnetically active material having fewer of the layers than the relatively increased volume of electromagnetically active material.

114. The system according to claim 112, wherein a thickness of the electromagnetically active material increases in a direction from the relatively reduced volume of electromagnetically active material to the relatively increased volume of electromagnetically active material.